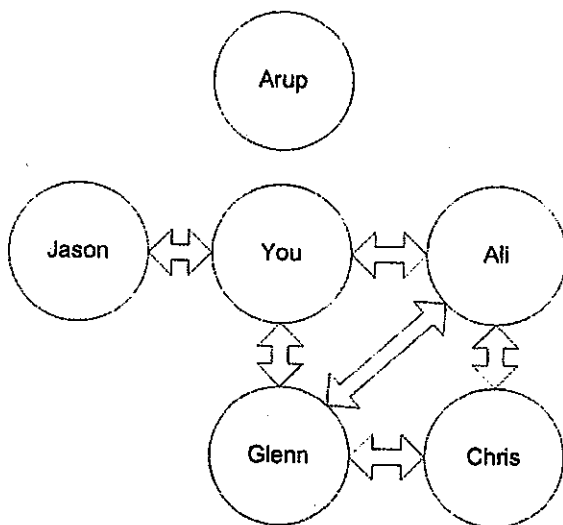


# FaceSpace Friends

Filename: friends

You've been surfing around the Internet a lot lately and have stumbled upon a variety of websites that allow you to create social networks with your friends. You've also noticed a few of your rivals have been going to these sites as well, and you are determined to show everyone how much cooler you are than them. You decide that you want a method to determine just how much cooler (or less cool) you are than your rivals.

Coolness is measured by summing the quantity of your immediate friends and the number of friends in your *extended network*. The number of friends in your extended network is calculated by adding up all of your friends, all of your friends' friends, all of your friends' friends' friends, and so on, taking care not to add any friend multiple times and not to add yourself. For example, if you are friends with Ali and Glenn, and Ali and Glenn are friends, you do not get extra coolness points for Ali and Glenn being friends since you are already friends with both. Similarly, you only get one point for any friends they share. Consider the following example, with six people registered in the FaceSpace social network:



Your friends : 3 (Jason, Ali, Glenn)  
Friends in your  
extended network : 4 (Jason, Ali, Glenn, Chris)  

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Your coolness : 7

*Notice that Arup has no friends, and  
does not give coolness to anyone.*

## The Problem:

Your task is to write a program which takes in an entire FaceSpace social network and a list of your rivals and determines how much cooler (or less cool) you are than each of your rivals. Note that because the social network of friends changes from week to week, you want to be able to process multiple social networks.

## The Input:

The input will begin with a positive integer,  $n$ , on a line by itself representing the number of social networks which will follow. Following this will be  $n$  social networks, each of which includes the list of people currently registered on FaceSpace, and all of their current friendships. This will be followed by a list of your current rivals. Each social network will be separated into multiple lines as follows:

- The first line contains only a positive integer,  $f$  ( $1 \leq f \leq 50$ ), representing the number of people registered in the social network.
- The second line contains exactly  $f$  names where each name is:
  - Unique within the social network under consideration.
  - guaranteed to consist of only upper and lowercase letters.
  - between 1 and 70 characters, inclusive.
  - case sensitive ("Arup"  $\neq$  "arup").
  - separated by one space from the next/previous name.
  - one of the names in the list will always be "You" (quotes for clarity).
- The third line contains only a nonnegative integer,  $c$ , where  $c \leq (f \times (f - 1)) / 2$ , representing the number of friend connections in the social network.
- Starting at the 4<sup>th</sup> line, there will be  $c$  lines containing friend connections of the form *friend1 friend2*, where:
  - *friend1*  $\neq$  *friend2*.
  - friend connections always go both ways (that is, *friend1* is friends with *friend2* and *friend2* is friends with *friend1*).
  - *friend1* and *friend2* will be separated by one space.
  - *friend1* and *friend2* are both guaranteed to be registered in the current social network.
- On the next line will be a nonnegative integer,  $r$  ( $r \leq 10$ ), representing the number of rivals whom you want to compare your coolness with for the current social network.
- This will be immediately followed by  $r$  lines, each containing only the name of a rival. Note that the only guarantee on rivals is that you will not be your own rival. There is no guarantee that your rivals will be cool enough to know about FaceSpace, and so they may not be registered at all in the social network being reviewed. In that case their coolness is, obviously, 0.

## The Output:

For each FaceSpace social network, begin the output with the line "Social Network  $i$ :" where  $i$  is the social network being processed (beginning with 1). Follow this with  $r$  lines, one for each of your rivals. Each of these lines should begin with three spaces followed by the phrase " $m$ : Difference of  $p$  point(s)." where  $m$  is the name of the rival who you are currently comparing your coolness with and  $p$  is your coolness points minus your rival's coolness points. Each social network should be followed by a blank line.

**Sample Input:**

```
2
6
You Arup Jason Ali Glenn Chris
6
You Jason
You Ali
You Glenn
Glenn Ali
Ali Chris
Glenn Chris
2
Arup
Chris
5
You Ross Dan Amy Casey
5
You Dan
Casey Dan
Ross Casey
Amy You
Amy Casey
2
Ross
Casey
```

**Sample Output:**

```
Social Network 1:
  Arup: Difference of 7 point(s).
  Chris: Difference of 1 point(s).

Social Network 2:
  Ross: Difference of 1 point(s).
  Casey: Difference of -1 point(s).
```